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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/655,904
Filing Date	Sept. 5, 2003
First Named Inventor	James D. Parsons
Art Unit	2878
Examiner Name	Otilia Gabor
Attorney Docket Number	378-21-034
Total Number of Pages in This Submission	20

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) ________
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [x] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below):
  - Itemized Postcard
  - Appeal Brief (18 pages)

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	KOPPEL, JACOBS, PATRICK & HEYBL
Signature	Richard S. Koppel
Printed name	RICHARD S. KOPPEL
Date	November 4, 2005
Reg. No.	26,475

CERTIFICATE OF EXPRESS MAILING Mail Label No. EV460256052US

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Signature	E N Nakada
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 250.00

Complete if Known	
Application Number	10/655,904
Filing Date	Sept. 5, 2003
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Art Unit	2878
Attorney Docket No.	378-21-034

METHOD OF PAYMENT (check all that apply)

☑ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): ____________

☑ Deposit Account Deposit Account Number: 11-1580 Deposit Account Name: Richard S. Koppel

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims ______ - 20 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims ______ - 3 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims **Fee ($)** ______ **Fee Paid ($)** ______

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets ______ - 100 = **Extra Sheets** ______ / 50 = **Number of each additional 50 or fraction thereof** ______ (round **up** to a whole number) x **Fee ($)** ______ = **Fee Paid ($)** ______

4. OTHER FEE(S) **Fees Paid ($)**

Non-English Specification, $130 fee (no small entity discount) ______

Other (e.g., late filing surcharge): APPEAL BRIEF (small entity fee $250.00) $250.00

SUBMITTED BY

Signature	Richard S. Koppel	Registration No. (Attorney/Agent) 26,475	Telephone (805) 373-0060
Name (Print/Type)	Richard S. Koppel		Date November 4, 2005

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/655,904
Applicant	:	JAMES D. PARSONS
Filed	:	Sept. 5, 2003
TC/A.U.	:	2878
Examiner	:	OTILIA GABOR
Docket No.	:	378-21-034

Title: ACOUSTIC ABSORPTION RADIATION SENSING IN SiC

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

APPEAL BRIEF

TABLE OF CONTENTS

(1) Real Party in Interest

The real party in interest is Heetronix, a Nevada corporation and assignee of record of the above application.

(2) Related Appeals and Interferences

None.

(3) Status of Claims

Claims 1-26: rejected and appealed.

(4) Status of Amendments

No amendments have been field subsequent to final rejection.

(5) Summary of Claimed Subject Matter

The invention enables the use of SiC to detect electromagnetic radiation (ER) at wavelengths less than about 10 micrometers. (Specification page 3, lines 2-8; page 3, line 34 - page 4, line 1). This is accomplished through the use of an acoustic absorption mechanism in SiC (page 3, lines 6-12; page 4, lines 7-26; page 6, lines 30-35; page 7, lines 2-7; Fig. 1, SiC body 6). To achieve acoustic absorption in SiC, the thickness of the SiC body is preferably at least about 400 micrometers (page 3, lines 7-12; page 4, lines 19-26; Fig. 1, SiC body 6). The SiC body preferably has a uniform thickness (page 3, lines 16-9; page 6, lines 30-32; Fig. 1, SiC body 6).

Independent claim 1 requires a SiC body at least about 400 micrometers thick, and a detector arranged to detect acoustic absorption of ER having a wavelength less than about 10 micrometers by the SiC body.

Independent claim 9 claims the method of deleting ER by irradiating a SiC body at least about 400 micrometers thick with ER having a wavelength less than about 10 micrometers, and detecting an acoustic absorption response of the SiC body to the radiation

Independent claim 14 claims the method of deleting ER by irradiating a SiC body at least about 400 micrometers thick with ER having a wavelength less than about 10 micrometers, and detecting a response of the SiC body to the radiation.

Independent claim 19 claims the method of detecting ER by irradiating a uniform thickness body of SiC with radiation having a wavelength less than about 10 micrometers, and detecting acoustic absorption of the radiation by the body.

Independent claim 22 claims the method of detecting ER by irradiating a single crystal structure SiC body with radiation having a wavelength less than about 10 micrometers, and detecting acoustic absorption of the radiation by the body.

(6) Grounds of Rejection to be Reviewed on Appeal

(a) Whether claims 1-5 and 7-21 are unpatentable under 35 U.S.C.103(a) over Ichikawa.

(b) Whether claims 6 and 22-26 are unpatentable when no reason for their rejection was given in the Final Office Action.

(7) Argument

(a) Rejection Under 35U.S.C.103(a) over Ichikawa

(i) Claims 1-5 and 9-13

A Claimed Range That Overlaps a Prior Art Range Can Be Patentable

Each of these claims require the detection of ER having a wavelength less than about 10 micrometers by an SiC body having a thickness of at least about 400 micrometers, by detecting acoustic absorption of the ER.

These claims were rejected under 35U.S.C.103(a) over Ichikawa (U.S. Patent No. 5,025,243). This rejection was based in part upon these claims involving a detection of radiation having a wavelength less than about 10 micrometers, Ichikawa disclosing a detection of infrared radiation, and an assertion that the "near" and "intermediate" infrared ranges are covered by the recited "less than about 10 micrometers" range.

However, Ichikawa does not disclose any particular portion of the infrared spectrum at which it operates; it merely refers throughout its disclosure to infrared radiation in general. As recently confirmed by the Federal Circuit in In re Kumer, 418 F.3d 1361, 1366 (Fed. Cir. 2005), "A *prima facie* case of obviousness may be made when the only difference from the prior art is a difference in the range or value of a particular variable. [cites omitted]" The Court went on to recite examples of how such a *prima facie* case could be rebutted:

"An applicant may rebut a *prima facie* case of obviousness by providing a "showing of facts supporting the opposite conclusion." Such a showing dissipates the *prima facie* holding and requires the examiner to "consider all of the evidence anew." Piasecki, 745 F.2d at 1472; In re Rinehart, 531 F.2d 1048, 1052 (CCPA 1976). Rebuttal evidence may show, for example, that the claimed invention achieved unexpected results relative to the prior art, In re Geisler, 116 F.3d 1465, 1469-70 (Fed. Cir. 1997); that the prior art teaches away from the claimed invention, id. at 1471; that objective evidence (e.g., commercial success) supports the conclusion that the invention would not have been obvious to a skilled artisan, Piasecki, 745 F.2d at 1475; or that the prior art did not enable one skilled in the art to produce the now-claimed invention, In re Payne, 606 F.2d 303, 314-15 (CCPA 1979)." (418 F.3d at 1368).

Infrared radiation is defined as the region of the electromagnetic spectrum between 0.7 and 1,000 micrometers. (see Van Nostrand's Scientific Encyclopedia, seventh edition, Van Nostrand Reinhold, 1989, page 1551, cited in the May 25, 2005 Amendment). Thus, the portion of the infrared spectrum "having a wavelength less than about 10 micrometers", as claimed, represents approximately one percent of the overall infrared range.

Finding a way to operate in the narrow portion of the infrared range below 10 micrometers constituted an "unexpected result" because, as stated at page 1, line 26 - page 2, line 3 of the specification, "acoustic absorption has not been observed in SiC for wavelengths below about 10 micrometers, thus eliminating part of the IR band along with shorter wavelengths". The other radiation absorption mechanisms either do not function in the infrared range (bandgap absorption, page 21, lines 4-18), or occur only at the specific wavelengths corresponding to the absorption energy of an impurity in the SiC (page 2, lines 19-34). Acoustic absorption "is a desirable absorption mechanism when the detection is sought over a broad range of wavelengths, since it causes the resistance of a SiC chip to increase approximately linearly with the irradiating energy over an appreciable wavelength range"(page 1, lines 15-21).

Since it was not known in the art that SiC would absorb infrared radiation below 10 micrometers by acoustic absorption, and in fact no such absorption had previously been observed (page 1, line 24 - page 2, line 3), appellant has overcome the prima facie case of obviousness by showing that SiC actually can be made to exhibit substantial acoustic absorption for infrared wavelengths less than 10 micrometers. This discovery constituted an unexpected result that was contrary to the knowledge in the art at the time the invention was made.

While it was known that, for a correctly selected impurity, SiC would exhibit absorption for infrared wavelengths less than 10 micrometers, such absorption occurred only at specific wavelengths corresponding to the impurity absorption energy, not at other wavelengths. This was an impurity absorption mechanism, not acoustic absorption. The distinction between acoustic and impurity absorption is further emphasized in the application as follows: "IR radiation absorbed via acoustic absorption is converted directly into heat energy and causes the resistance of the SiC to increase roughly linearly with the IR energy, as opposed to impurity absorption

which causes the SiC resistance to drop." (Page 4, lines 14-18). Appellant's discovery of a broad band acoustic absorption mechanism in SiC, as opposed to very narrow band impurity absorption, at infrared wavelengths below 10 micrometers, offers distinct advantages over the previously known impurity absorption mechanism.

There is no suggestion in Ichikawa of detecting the approximately 1% of the IR range having a wavelength less than about 10 micrometers, or of employing an acoustic absorption mechanism within this wavelength range. In fact, Ichikawa suggests that, even if the incident IR were selected to be less than 10 micrometers, any resulting absorption would not have been the result of acoustic absorption. Ichikawa however, discloses a SiC monofilament or fibers with a diameter in the 3 - 200 micrometer range. The diameter of the irradiated filament ranged from 8 to 30 microns in the actual examples given. This contrasts with the preferred embodiment of the present invention:

> "Whereas no acoustic absorption has been observed for SiC at wavelengths below about 10 micrometers, applicant has discovered that a useful acoustic absorption mechanism can be obtained from SiC if it has a single crystal structure and its thickness is at least about 200 micrometers. While there may be some acoustic absorption with thinner samples, the amount is so small that it has not previously been observed." (Specification page 4, lines 7-14).

The SiC dimensions used in Ichikawa were too small to result in any observable acoustic absorption at wavelengths below 10 micrometers. Even at Ichikawa's upper limit of a 200 micron diameter (considerably larger than any of the fibers used in his examples), the fiber would be 200 microns thick only along its (infinitely narrow) center axis, which would not be enough for any appreciable acoustic absorption. Rejected claims, except for 1-5 and 9-13 all require that the thickness of the SiC body be at least about 400 micrometers, the preferred thickness given in the specification (page 3, lines 7-12; page 4, lines 23-26). In disclosing a fiber that is everywhere thinner than 200 microns except for an infinitely thin center diameter, and thus no more than half of applicant's claimed thickness, Ichikawa actually teaches away from applicant's concept of achieving acoustic absorption for wavelengths less than about 10 micrometers by providing a SiC body that is at least about 400 micrometers thick. Even with a 200 micron diameter, Ichikawa would

not achieve any appreciable IR acoustic absorption at less than 10 micrometers.

All of the above arguments were presented in the Amendment immediately preceding the Final Rejection. Although the Final Rejection included a section labeled "Response to Arguments," it simply ignored and did not respond to the following augments made by appellant:

1) The claimed wavelength range of less than about 10 micrometers within the 0.7 - 1,000 micrometer infrared band is critical, achieving the unexpected result of acoustic absorption for this range in which acoustic absorption had not previously been observed.

2) Ichikawa taught a fiber diameter of up to a maximum of 200 micrometers, only along an infinitely thin diameter, which would not have produced observable acoustic absorption.

3) Increasing Ichikawa's maximum dimension of 200 micrometers up to the minimum claimed thickness of about 400 micrometers would not have been obvious because the purpose of such an increase would have been to enhance acoustic absorption, bit acoustic absorption had not preciously been observed in SiC below 10 micrometers wavelength.

4) Using a greater SiC thickness does not merely change the size of the acoustic absorption, as claimed by the Examiner. No acoustic absorption at all is observable for thicknesses less than about 200 micrometers within the claimed wavelength range.

(ii) Claims 7, 8

These claims, which depend from claim 1, require that the thickness of the SiC body be uniform (claim 7), and that the body have a flat radiation receiving surface (claim 8). The Examiner argued that "… since Ichikawa does not disclose that the thickness of the body F changes throughout or that its surface roughness changes, it is assumed that the body F has uniform thickness and a flat surface."

Actually, body F of Ichikawa is shown as having a circular cross-section in FIGs. 1(b), 2(a) and 2(b), and is referred to as having a "monofilament diameter" at column 1, lines 63-64. There is no disclosure or sugges-

tion of a SiC body with a uniform thickness or flat surface.

(iii) Claims 14-18

These claims require an irradiating wavelength of less than about 10 micrometers and a SiC body at lest about 400 micrometers thick, but do not require acoustic absorption. However, the achievement of acoustic absorption for wavelengths below about 10 micrometers was appellant's motivation for this thickness. Since, as explained above, acoustic absorption has not been observed within this wavelength range with either Ichikawa or other prior art known to appellant, there would have been no motivation to increase the Ichikawa thickness to 400 micrometers.

(iv) Claims 19-21

These claims require irradiating a uniform thickness SiC body of SiC at a wavelength less than about 10 micrometers, and detecting acoustic absorption of the radiation by the body. Neither Ichikawa nor any other prior art known to appellant either discloses, suggests or operates by acoustic absorption in SiC at wavelengths below about 10 micrometers. Furthermore, the Examiner erroneously stated in the Final Rejection that "Ichikawa does not disclose the thickness of the body F changes throughout or that its surface roughness changes", and concluded that "it is assumed that the body F has uniform thickness and a flat surface". Actually, body F of Ichikawa is shown as having a circular cross-section in FIGs. 1(b), 2(a) and 2(b), and is referred to as having a "monofilament diameter" at column 1, lines 63-64. This was pointed out to the examiner in the Amendment preceding the Final Office action, but was ignored in that action. Ichikawa's circular cross-section negates the uniform thinness and flat surface claimed for it by the Examiner.

(v) Claims 6 and 22-26

These claims were subject to a 35U.S.C.112, second paragraph rejection and an obviousness-type double patenting rejection in the initial May 3, 2005 Office action, but not to any rejection over prior art. In response, appellant amended dependent claim 6 and independent claim 22 (from which claims 23-26 depend, directly or

indirectly), and submitted a terminal disclaimer. Although claims 6 and 22-26 were not discussed or identified as being rejected in the Final Office action, they were identified on the cover sheet as being rejected. Since no prior art has been cited against these claims, and the 35U.S.C.112 and double patenting rejections have apparently been resolved, appellant believes the inclusion with the other rejected claims in the Final Office action cover sheet was an error, that claim 6 should have been identified as being allowable if rewritten in independent form, and that claims 22-26 should have been allowed outright.

Respectfully submitted,

Dated: November 4, 2005

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CLAIMS APPENDIX

1. An electromagnetic radiation detection system, comprising:

a body of SiC having a thickness of at least about 400 micrometers, and

a detector arranged to detect acoustic absorption of electromagnetic radiation having a wavelength less than about 10 micrometers by said SiC body.

2. The system of claim 1, wherein said detector is arranged to detect infrared (IR) radiation absorption by said SiC body.

3. The system of claim 1, wherein the thickness of said SiC body is in the approximate range of 400-2,000 micrometers.

4. The system of claim 1, wherein said detector is arranged to detect increases in the resistance of said SiC body in response to said body receiving radiation having a wavelength less than about 10 micrometers.

5. The system of claim 1, further comprising a filter arranged to limit the reception of radiation by said SiC body to a narrow wavelength band.

6. The system of claim 1, wherein said SiC has a single crystal structure.

7. The system of claim 1, wherein the thickness of said SiC body is uniform.

8. The system of claim 1, wherein said SiC body has a radiation receiving surface that is flat.

9. An electromagnetic radiation detection method, comprising:

irradiating a body of SiC having a thickness of at least about 400 micrometers with electromagnetic radiation having a wavelength less than about 10 micrometers, and

detecting an acoustic absorption response of said SiC body to said radiation.

10. The method of claim 9, wherein said SiC body is irradiated with infrared (IR) radiation.

11. The method of claim 9, wherein the thickness of said SiC body is in the approximate range of 400-2,000 micrometers.

12. The method of claim 9, wherein said acoustic absorption is detected by detecting increases in the resistance of said SiC body in response to said radiation.

13. The method of claim 9, wherein said radiation comprises a band of multiple wavelengths.

14. An electromagnetic radiation detection method, comprising:

irradiating a body of SiC having a thickness of at least about 400 micrometers with electromagnetic radiation having a wavelength less than about 10 micrometers, and

detecting a response of said SiC body to said radiation.

15. The method of claim 14, wherein said SiC body is irradiated with infrared (IR) radiation.

16. The method of claim 14, wherein the thickness of said SiC body is in the approximate range of 400-2,000 micrometers.

17. The method of claim 14, wherein said response is detected by detecting increases in the resistance of said SiC body in response to said radiation.

18. The method of claim 14, wherein said SiC body has a uniform thickness.

19. An electromagnetic radiation detection method, comprising:

irradiating a uniform thickness body of SiC with radiation having a wavelength less than about 10 micrometers, and

detecting acoustic absorption of said radiation by said body.

20. The method of claim 19, wherein said SiC body is irradiated with infrared (IR) radiation.

21. The method of claim 19, wherein said acoustic absorption is detected by detecting increases in the resistance of said SiC body in response to said radiation.

22. An electromagnetic radiation detection method, comprising:

irradiating a body of SiC with radiation having a wavelength less than about 10 micrometers, said SiC body having a single crystal structure, and

detecting acoustic absorption of said radiation by said body.

23. The method of claim 22, wherein said SiC body is irradiated with infrared (IR) radiation.

24. The method of claim 23, wherein said acoustic absorption is detected by detecting increases in the resistance of said SiC body in response to said radiation.

25. The method of claim 22, wherein said acoustic absorption is detected over a band of multiple wavelengths.

26. The method of claim 22, further comprising filtering said radiation to a narrow wavelength band prior to irradiating said SiC body.

EVIDENCE APPENDIX

None

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RELATED PROCEEDINGS APPENDIX

None